313146

JPRS-WST-84-031

11 September 1984

West Europe Report

SCIENCE AND TECHNOLOGY

FBIS FOREIGN BROADCAST INFORMATION SERVICE

5
49
A03

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-WST-84-031

11 SEPTEMBER 1984

WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

FOREIGN BROADCAST INFORMATION SERVICE

49

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and characteristics retained.

Headlines, editorial reports, and material enclosed in brackets are supplied by JPRS. Processing indicators such as (Text) or (Excerpt) in the first line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U. S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U. S. Government Publications issued by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available through Bell & Howell, Old Mansfield Road, Wooster, Ohio, 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-WST-84-031

11 September 1984

WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

CONTENTS

ADVANCED MATERIALS

FRG Research in Ceramic Parts for Gas Turbine Engines
(DFVLR-NACHRICHTEN, Jun 84)............................... 1

Briefs
French Optical Fiber Manufacturing 3

AEROSPACE

Space Insurance Firms View Shuttle, Ariane Reliability
(Fabio Pagan; AVIAZIONE, May 84).......................... 4

DFVLR Official on Areas of U.S.-FRG Space Station Cooperation
(Hartmut Sax; DFVLR-NACHRICHTEN, Jun 84).................. 8

AUTOMOBILE INDUSTRY

British Breakthrough in Lightweight Lithium Batteries
(C. L. Boltz; ELEKTRONIKER, Jul 84)....................... 23

COMPUTERS

France's Use of Cray 1, Plans for National Supercomputer
(LES ECHOS INDUSTRIE, 20 Jun 84).......................... 25

Need to Master Supercomputer Technology, by Jean Deflaceliere
Number of Supercomputers in France, by Anne-Marie Blanchet
Need for European Cooperation
Research Projects on Cray 1
Breeder Reactor Calculations
Access to Supercomputers in France
Nuclear Applications
Missile Testing

 [III - WE - 151 S&T]

FACTORY AUTOMATION

Multinational Program To Develop Intelligent Robots
(AFP SCIENCES, 19 Apr 84; ELECTRONIQUE ACTUALITES, 4 May 84).. 33

Program Announced
Commentary

Briefs
Italian Robot for Auto Industry 37

MICROELECTRONICS

FRG Develops New Kind of Sensor for Microelectronics Use
(VDI NACHRICHTEN, 13 Jul 84)............................ 38

Plessey Introduces New 'Standard' Magnetic Bubble Memory
(EEE, 10 Jul 84).. 39

SCIENTIFIC AND INDUSTRIAL POLICY

FRG Research on Composite Materials, Columbus Program Published
(DFVLR-NACHRICHTEN, Jun 84)............................. 41

Italy Discontented Over Allotment of Esprit Funds
(Maria Grazia Bruzzone; L'ESPRESSO, 1 Jul 84)............ 43

TECHNOLOGY TRANSFER

Briefs
Increase in Technology Exchange 45

FRG RESEARCH IN CERAMIC PARTS FOR GAS TURBINE ENGINES

Cologne DFVLR-NACHRICHTEN in German Jun 84 p 52

[Article: "Third BMFT Status Seminar on Ceramic Parts for Automotive Gas-Turbine Engines"]

[Text] From 1974 through 1983 the research program "Ceramic Parts for Automotive Gas Turbines" was supported by the Federal Ministry for Research and Technology (BMFT) in the German ceramic and automotive industries as well as in various associated research institutes. Under the focal categories materials research, environmental protection and energy conservation, the research program pursued the following objectives: conservation of scarce, expensive or strategically important raw materials through substitution of domestic materials available in unlimited quantities; avoidance of fuel additives such as lead; adherence to U.S. limits on exhaust-emission pollutants; low drive system noise and vibration; multifuel capability; energy conservation through reduction of weight at the same power or increased power at the same volume and lower weight.

Most of these goals can be achieved by a gas turbine. However, an absolute requirement for the economical operation of a small gas turbine is that the turbine inlet temperature amounts to at least 1,300 deg C. But, due to the planned use of such turbines in passenger cars, trucks and work vehicles, expensive cooling systems are out of the question for economic reasons. On the other hand, the stated turbine inlet temperature is too high for metallic materials so that the ceramic materials silicon nitride and silicon carbide represent the only possible materials for such a design within the purview of today's knowledge. During the life of the research program, considerable success was achieved with respect to material and parts development. At the beginning of the research program the greatest problems had to do with retraining the designer to design with ceramics which was a new material to him and, reciprocally, to demand from the ceramics engineer materials of a quality adequate to meet the requirements of highly stressed machines. After intermediate results of the research projects had been presented at two status seminars in the spring of 1978 and the fall of 1980, the final report covering all of the projects involved was presented at the third and final status seminar in BAD Neuenahr from 13-15 February 1984. Here it was shown that the established goals for several gas-turbine parts have already been met; the goals for others are about to be met; but in the case of several components, further intensive development of ceramic materials is still required. A gas turbine with ceramic rotors has already been tested with very satisfactory results in a research auto belonging to Daimler-Benz, a program participant.

Almost 300 participants including 60 guests from 10 foreign countries took part in the seminar. In line with the BMFT contract, the program manager and the program monitor, the DFVLR Institute for Materials Research in Cologne-Porz, were responsible for the structure and organization of the status seminar. The DFVLR institute was represented with several papers:

--W. Bunk: Thoughts on the International Status of Technical Ceramic Materials and Components--Present and Future.

--M. Boehmer: Report of the Program Manager on the Support Program "Ceramic Parts for Automotive Gas Turbines."

--J. Heinrich and M. Boehmer: Material and Part Development by Hot Isostatic Pressing in the Case of Silicon Nitride.

All papers have been published in a seminar volume "Ceramic Components for Automotive Gas Turbines III" which can be obtained from Springer Verlag for DM 188.

9160
CSO: 3698/546

BRIEFS

FRENCH OPTICAL FIBER MANUFACTURING--Paris--Within the framework of a study of processes of fiber production and their integration into cable production techniques, a CNET (National Center for Telecommunications Studies) group has devised a process (patented by CNET) particularly well suited to cable structures developed in France (grooved cylindrical structure or U-shaped structure for distribution cables). This process combines a technique of fiber manufacture capable of stretching several fibers parallelly (multifiber production) with the production of straight line cable. According to INNOVATION TELECOM, a CNET publication, a prototype machine has been built at CNET. It necessitated the study of a multifire oven as well as a regulating device for the lowering of molds and a device for feeding and injecting the fibers into the cable. General ordering and spooling of the cable have been turned over the CEM and SILEC companies. An initial feasibility test has been performed for multifiber and continuous cable production; the finishing touches are now being made. This is a world first which demonstrates the feasability of this process which guarantees the quality of the cables produced while eliminating the intermediate steps of measuring, storage and transportation. It calls into question the manufacturing processes now in use for fibers and cables. Its economic advantages inspire hope for good industrial development for the manufacture of optical cables suited to the video communication network. [Text] [Paris AFP SCIENCES in French 19 Apr 84 p 83] 12666

CSO: 3698/576

SPACE INSURANCE FIRMS VIEW SHUTTLE, ARIANE RELIABILITY

Rome AVIAZIONE in Italian May 84 pp 288-289

[Article by Fabio Pagan: "Insurers Like Ariane Better Than Shuttle"]

[Text] Recent Space Shuttle difficulties and conversely, the success of the European rocket's latest mission are having an impact on major insurance companies involved in space.

Can one notice a trend shift in the Shuttle-Ariane competition? Has the nonretrievable rocket from the old continent become more dependable with respect to the very sophisticated shuttle, tasked with placing in orbit those space telephone switchboard so desired by today's telematic society? Perhaps it may be a bit premature; however the events of the first part of 1984 appear to have turned around, or at least modified, the terms of the US European commercial contest in space.

The shuttle, after having scored one success after the other, through no fault of its own failed twice during its 10th mission, last February. This occurred when telecommunications satellites Westar-6 and Palapa B-2 (belonging to Western Union and the Indonesian government respectively) grossly failed to attain geosynchronous orbit because of a propulsion malfunction. Arian, following a very hesitant beginning, (two failures out of the first five launches), appears to have embarked on the right path and in the beginning of March, during its 8th test, succeeded in placing the Intelsat V F8 in orbit, which, with its 1800 kilos in weight, is the heaviest telecommunication satellite now in space. (The previous Intelsat was also placed in orbit by the Ariane last October, whereas the first six satellites of this series were orbited by Atlas-Centaur boosters).

Arianes 8th launch was the last done under ESA management. From now on it will be the Arianespace company to manage the rocket's performance, albeit under the CNES [National Center for Space Studies] umbrella. (Italy contributes 3.6 percent to this effort, with its industries and its San Paolo Banking Institute of Turin.) Arianespace recently published a schedule of flights to be undertaken from 1984 through 1987, including satellites to be launched. It is a rather full schedule (see table) which calls for launching 27 satellites (plus about 10 options) for 14 customers. In economic terms, it involves a package worth 740 million dollars: 40 percent

of this sum comes from the launch of non-European satellites. At the present time, Arianespace is busy trying to lure away customers from the shuttle program, canvassing the very same key market of U.S. telecommunication companies. Presently, complex negotiations are underway with five or six large U.S. companies, following the contracts signed with General Telephone and Electronics to launch their satellites.

As can be seen in the diagram of the launch calendar, this year the Ariane 3 will undergo its first tests. The Ariane 3 is capable of placing a 2580 kilo payload in transfer orbit. The main rocket is assisted by two externally mounted, solid propellant boosters, each capable of a 70-ton thrust. They are being built in Italy by SNIA-BPD. In 1985 the Ariane 2 version will be launched, slightly more powerful than the present Ariane 1, able to lift a payload of 2175 kilos. Finally, in 1986 the Ariane 4 will come on line, with six different versions and a payload capability varying from 1900 kilos to 4200 kilos, thus able to guarantee great flexibility of employment.

The long-range optimism that is linked to this busy schedule (which will then be extended to 1988-89) appears justified in view of the various technical and economical considerations. General Jacques Mitterrand, brother of the French president and former head of Aerospatiale, a leading figure in the European space industry, states that the shuttle's recent troubles "confirm what we have always said regarding Ariane's positive points: primarily its ability to place a geostationary satellite directly in orbit, with an apogee that has already reached 36,000 kilometers from earth, thus significantly reducing maneuvers undertaken with the auxiliary engine, whereas the shuttle 'works' at a ceiling of between 250 and 300 kilometers."

With regard to the commercial aspect, according to Frederic d'Allest, CNES general manager, each shuttle mission presently costs between 250-300 million dollars, compared to 40-50 million for Ariane. NASA replies by stating that placing commercial and scientific satellites in orbit is only a part of the mission normally assigned to the shuttle.

Sometimes even that isn't the most relevant part of the mission, though there is certainly considerable value in terms of "image" and commercial exploitation for the American spacecraft. They also note that thinks to the progressively shorter times between one flight and the next, by the end of this year, the costs might even be halved. European observers note however, that NASA's space vehicle is operated in a promotional mode, applying "political" prices to satellite launches. Thus, in the near future, the conditions offered by both competing space systems could be about even.

Finally, one must consider the insurance aspect. Benito Pagnanelli, in charge of the space office of the Assicurazioni Generali di Trieste, long involved in the "space risks" branch, stated "The failure to place the 2 satellites in geostationary orbit was a serious setback for the shuttle's credibility. Currently numerous meetings are being held to discover the causes of the engine malfunction, which appear to be the main cause of the

double failure. From an insurance point of view, this confirms what we have always sustained: the premiums are too low, be it for the Ariane, be it for the shuttle, whose payments have been very low. Therefore, substantial increases are called for in order to launch additional satellites. It is difficult at the present, to be specific in this regard: the premiums however will have to be increased by at least 30 percent. And without a doubt, the shuttle will experience a proportionally greater increase."

At the present, the balance of space insurance agencies throughout the world is about 150 million dollars in the red; 410 million were payed out for damages by insurance companies for failed launches or satellite malfunctions. Only 260 million have been taken in so far. The failure to orbit in geostationary orbit the Wester-6 alone meant the loss of 70 million pounds for Lloyds of London, the most serious in the history of satellite insurance. However, it is necessary to recall that over half of that sum has been reinsured by Lloyds on the British market through the Sedgwick enterprise, while the rest was placed on the U.S. market. Faced by such large amounts, some French and U.S. companies have abolished their "space insurance" branches or they have temporarily suspended activities in this sector in order to redefine risks and costs with greater accuracy.

There are also other problems to consider. Some are more subtle, but at the same time are of some substance. For example: if the Palapa satellite had not been launched by the shuttle following the failure of the preceding satellite, and it had returned to earth inside the shuttle, this would have represented a loss for the insurance companies just the same, because even if the vehicle was not a total loss, the Indonesian government would have had the option to "refuse" the satellite due to the possible damage incurred during the reentry phase because of vibrations and accelerations.

Another problem: the two satellites launched by the shuttle are presently in orbit which, though very stable, makes them useless for the mission they were originally assigned. Hughes Aircraft (which built both, almost identical vehicles), stated that for the time being their orbits could be raised using the fuel remaining in their tanks and wait for a future opportunity in which the shuttle may draw up near them and perhaps recover or repair them. But, in this case, who would pay for such an operation? NASA, Hughes, or perhaps, in the case of the Palapa satellite - the Indonesian Government?

CALENDAR OF ARIANE LAUNCHES 1984-1987

May 84	Ariane 1	Spacenet-1
July 84	Ariane 3	ECS-2 + Telecom-1A
September 84	Ariane 3	Marecs-B2 + GSTAR-1A
November 84	Ariane 3	Arabsat-a + Spacenet-2
January 85	Ariane 3	Telecom-1B or SBTS-1 + GSTAR 1B
March 85	Ariane 3	SBTS-1 or Telecom-1B + Spacenet-3
May 85	Ariane 1 or 2	Spot-1 + Viking or Intelsat V F9
July 85	Ariane 1	Giotto
August 85	Ariane	SBTS-2 + ECS-3

CALENDAR OF ARIANE LAUNCHES 1984-1987 (continued)

September 85	Ariane 2	TV-Sat
October 85	Ariane 1 or 2	Intelsat V or Spot-1 ± Viking
November 85	Ariane 2	TDF-1
January 86	Ariane 2	Intelsat V A F15
March 86	Ariane 4	Athos + Meteosat + Arsenne + Amsat
May 86	Ariane 3	?
August 86	Ariane 4	Unisat-1 (p) + ?
November 86	Ariane 3	STC-1 (p) + ?
December 86	Ariane 4	Intelsat VI (p)
February 87	Ariane 4	Tele-X (c) + Unisat-2 (p)
March 87	Ariane 3	DBSC-1 (p)
April 87	Ariane 4	Intelsat VI (p)
May 87	Ariane 3	TDF-2 (p)
June 87	Ariane 3 or 4	DFS-1 (p) + Meteosat-1 (p)
July 87	Ariane 3	Olympus (c)
August 87	Ariane 4	Intelsat VI (p)
September 87	Ariane 3	DBSC-2 (p)
October 87	Ariane 4	Italsat (p) + Rainbow (p)
December 87	Ariane 2	Spot-2 (c)

N.B. The symbol (c) indicates the contract for the satellite has not yet been signed; (p) indicates the satellite has been reserved for that flight; the question mark indicates the spot is still free.

9209
CSO: 3698/561

DFVLR OFFICIAL ON AREAS OF U.S.-FRG SPACE STATION COOPERATION

Cologne DFVLR-NACHRICHTEN in German Jun 84 pp 19-25

[Article by Hartmut Sax, dipl phys, staff department for program preparation of the DFVLR [German Research and Test Institute for Aeronautics and Astronautics]: "Columbus--A Plan for Cooperation Between Europe and the United States in the Space Station Program"]

[Text] Importance of the Space Station

The term "space station program" refers to the creation of an orbital infrastructure for the future which encompasses a multitude of interdependent manned and unmanned elements in a variety of orbits. Their most outstanding common features are multiple applicability, ease of maintenance and ease of repair.

The operational basis of this orbital infrastructure can be a permanent manned space station in low earth orbit, as chosen by the United States, or--with certain limitations--it can be a "virtual space station" which occupies an orbit only for limited periods of time and then returns to earth. An example of the latter type of space station is the Orbiter of the American space shuttle system in conjunction with the European Spacelab while the latter occupies an orbit around the earth.

It is the primary goal of a space station program to lower the cost of individual missions by using the station over a long period of time and at the same time to open up space to new forms of scientific and commercial exploitation.

European Goals

The desired cooperation between Europe and the United States in the space station program has the following goals:

1. to build step by step the orbital infrastructure, consisting of continuously maintained space platforms and manned space laboratories--this construction being oriented toward the concrete and predicted European needs within the disciplines of the space sciences, earth surveillance, telecommunication and the use of microgravitation for research and applications in the areas of materials science and bioscience;

ii. to make it possible for European industry to participate in this technologically important development and thus maintain its presence in the international astronautical market for orbital systems;

iii. through transatlantic cooperation in the form of joint use or cooperative construction of individual elements of this orbital infrastructure to enhance its economic position and to extend its initial exploitation potential for both sides.

Within the context of studies which at the present time are in progress within the DFVLR with the participation of industry and users under the project designation "Columbus," concrete proposals are being worked up.

Applications Aspects

The point of departure of planning studies is the users' needs while at the same time taking into account the astronautical programs which have thus far been carried out in the FRG and in Europe, as well as current and planned astronautical programs.

Figure 1 shows the results of a comprehensive utilization study which was conducted by the DFVLR under contract to the European space agency ESA and which is based upon the results of questionnaires and discussions involving all relevant user groups in Europe. In this connection there have also been organized two user symposia within the national framework and involving about 100 experts. The investigations undertaken in the United States and Japan have come to similar conclusions. With regard to the importance of the platform alternatives relative to individual user disciplines we have the following facts:

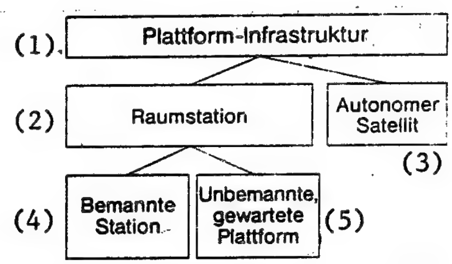
Astrophysical observatories in space having telescopes mounted on continuously maintained platforms have been acquiring increasing importance in the space sciences (Figure 2).

In contrast to terrestrial observatories observation capability in space is unaffected by interference and atmospheric absorption. Such space stations consist of one or more telescopes which can be used over long periods of time with variable instrumentation by a multitude of scientists. This presupposes, however, that it is possible for the instrumentation to be modified in accordance with shifting directions of scientific inquiry and that it is possible to guarantee a long useful life through interim maintenance (e.g., replenishment of coolants). Telescopes for the longer-wave spectral regions because of their greater dimensions require construction in space.

Two of the five mission projects currently in the commitment of the space program (ROSAT, GIRL) as well as the ESA project ISO and the NASA/ESA project Space Telescope are examples and forerunners in this developmental area. But their potential utility is, however, subject to limitations because up to now the available orbital infrastructure is still at an early stage. Over the long term an efficient orbital infrastructure is indispensable for the space sciences in the form of continuously maintained platforms.

The development of earth-oriented remote exploration from space is characterized by an increasing complexity of the useful loads as well as growing demands imposed particularly upon energy supply and data transmission. If a limit is to be set to the high cost risk, continuously maintained space platforms are an important step toward the operational use of such earth surveillance systems since these would have to be continuously available and would have to be capable of occupying orbits other than those attainable by the shuttle.

This applies particularly to active sensors like radar or laser. The high costs of such systems and the demonstrated technical risks (the failures of Seasat and MRSE) have led to the testing of new sensors first on the shuttle or on reusable systems such as Spacelab or SPAS. This procedure has already proven its worth for the development of optical and microwave sensors within the framework of the German space program (Figure 3). Despite functional breakdowns which have occurred it will nevertheless be possible to quickly restore to operation the MOMS and MRSE devices which have been developed at great expense. Without this possibility the planned scientific utilization program would to a large extent have been impossible to carry out. NASA's interest is so great that it has even offered flight opportunities with the space shuttle free of charge.



Disziplin (6)	Missionsmodelle	(4)	(5)	(3)
Materialwissenschaften (7)	Typ „Experiment"	++	O	--
	Typ „Produktion"	++	++	--
Biowissenschaften (8)	Medizin	++	--	--
	Biologie	++	++	--
Weltraum-wissenschaften (9)	Test, Montage	+	++	--
	Operation. Einsatz	-	++ *)	++ *)
Erdbeobachtung (10)	Test, Montage	+	++	--
	Operation. Einsatz	-	++ *)	+ *)
Kommunikation/ Navigation (11)	Test, Montage	+	++	--
	Operation. Einsatz	--	+ *)	++ *)

* In each case for different tasks.

Fig. 1. Utility of platform infrastructures for astronautical application (application aspects ++ = best utility, + = good utility, 0 = limited utility, - = low utility, -- = unsuitable).

Key: 1. Platform infrastructure
2. Space station
3. Autonomous satellite
4. Manned station

Key to Figure 1 (continued)

5. Unmanned, continuously maintained platform
6. Discipline: mission models
7. Materials sciences: "experimental" type; "production" type
8. Biosciences: medicine; biology
9. Space sciences: testing, assembly; operational use
10. Earth surveillance: testing, assembly; operational use
11. Communications/navigation: testing, assembly; operational use

In this connection attention is drawn to the fact that the American exploration satellite Landsat-4 which is already in operation is the first satellite which can be returned to earth for overhaul and subsequent reuse. Since such work can in future be done in space as was for the first time demonstrated in April 1984 with the repair of the Solarmax satellite, there will no longer be high costs for return transport to the earth and a second launch.

In the nearer future the space station concept will have little effect upon telecommunication which preponderantly serves geostationary satellites at an altitude of about 36,000 km--apart from technological test flights.

However, over the long term maintenance and repair activities in a geostationary orbit, which would have to take place fully automatically are entirely possible. This would make new types of telecommunications platform designs feasible which could solve the problem of crowding in the geostationary orbit. Manned space stations in low orbits will also serve for unfolding or assembling as well as measuring and testing large antennas for future telecommunications satellites. This would be done with human support and would take place before bringing such antennas from the low earth orbit into the geostationary orbit.

The disciplines of "research under weightlessness" (materials sciences, biosciences and physical-chemical process technology) constitute the youngest domains of astronautics utilization since in these activities a return of the samples is indispensable. Manned space laboratories are their most important instrument.

The applications potential still has to be solidified through fundamental research studies and experiments. Since here, however, we are dealing with a sector which is technologically and economically of extraordinary importance an appropriate expenditure for space experiments would be fully justified. Such an expenditure would amount to something like 1 percent of the total funds expended on research and development in Germany in these areas.

The FRG, on the basis of the German Government space program at the present time occupies a leading position next to the United States in the domain of research under weightlessness. Starting with experiments employing high-altitude research rockets this program is being continued and augmented through the use of the Spacelab (FSLP, D1, D2) and also in future through the use of returnable platforms (EURECA, SPAS) (Figure 4). As early as the first Spacelab flight toward the end of 1983 the presence of scientific astronauts turned

Programm (1)		Projekt (2)	Plattformtyp: autonomer Satellit (6)	Plattformtyp (3): Shuttle/SL SPAS-01	Plattformtyp: freiliegende Plattform (7)	Betriebskonzept: im Orbit wartbar (8)	Betriebskonzept (4): rückführbar (9)	Betriebskonzept: wiederverwendbar (10)
D	Entwicklung (11)	AMPTE	X					
		GALILEO	X					
		ROSAT			X			(X)
		GIRL		X		(X)	X	X
		GRO			X		X	X
ESA	Entwicklung	GIOTTO	X					
		SPACE TELESCOPE			X	X	X	X
		ISPM	X					
		HIPPARCOS	X					
	Studien (12)	ISO			X	?	?	?
		CLUSTER	X					
		SOHO	X					
		KEPPLER	X					
		X-80/XMM			X	?	?	?

Starttermine (5)

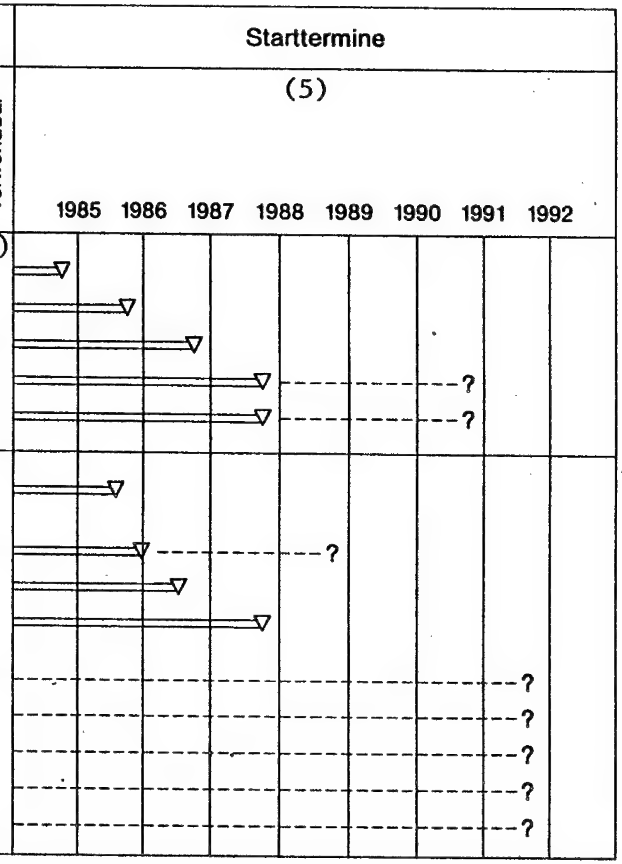


Fig. 2. German and European projects and project participations in space research (D = FRG, ESA = European Space Agency, SL = Spacelab).

Key:
1. Program
2. Project
3. Platform type
4. Operating concept
5. Launch date
6. Autonomous satellite
7. Freely orbiting platform
8. Maintenance possible in orbit
9. Returnable
10. Reusable
11. Development
12. Studies

Pro-gramm (1)	Projekt (2)	Plattformtyp: autonomer Satellit (6)	Plattformtyp (3): Shuttle/SL SPAS-01	Plattformtyp: freifliegende Plattform (7)	Betriebskonzept: im Orbit wartbar (8)	Betriebskonzept (4): rückführbar (9)	Betriebskonzept: wieder-verwendbar (10)
D	ATLAS						
	-A, B		X		X	X	X
	-C			X	(X)	X	X
	MOMS						
	-01		X		(X)	X	X
	-Stereo		X		(X)	X	X
	-IR		(X)	X	(X)	X	X
(11)	Mikrowelle						
	-MRSE		X		(X)	X	X
	-X-SAR		X		(X)	X	X
	-X-SAR-F.		(X)	X	(X)	X	X
(12)	Atmosphäre						
	-MAS/MIPAS		X	X	(X)	X	X
	-CSR	X					
	PRARE	(X)		X		X	X
ESA	ERS-1	X					

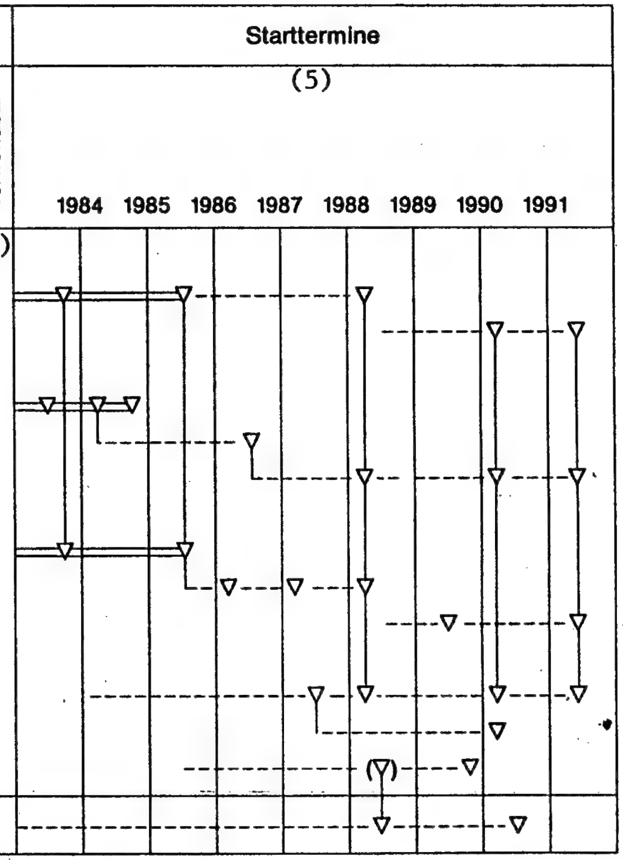


Fig. 3. German and European projects for earth-oriented remote exploration (for explanations compare Figure 2).

Key:
1. Program
2. Project
3. Platform type
4. Operating concept
5. Launch date
6. Autonomous satellite
7. Freely orbiting platform
8. Maintenance possible in orbit
9. Returnable
10. Reusable
11. Microwave
12. Atmosphere

out to be useful scientifically to an extent which even optimists had hardly expected.

A systematic research program requires the performance of a multitude of serial experiments involving varying parameters. Such experiments presuppose fairly long and frequent flight opportunities such as are offered during the second half of the eighties by Spacelab and EURECA. But the use of these systems is subject to sharp limitations of time because of the necessity for return to earth after a few days or months and in consequence of the high launch and return transport costs required in each instance the systems are disproportionately expensive.

A space laboratory which stays in orbit or space platform which can be supplied in orbit reduce by orders of magnitude the masses of useful load which must be transported and they permit a program of continuous use and hence also constitute a prerequisite for every sort of operational or even commercial application.

Figure 5 shows in summary the extent to which the most important utilization disciplines of astronautics will depend in the nearer future upon the functions of an orbital infrastructure. Over the longer term the trend distinctly indicates increasing utilization of space station elements for operational or even commercial applications.

The Engineering Design of Columbus

The preceding discussion shows that recent useful load developments such as the astrophysical telescope GIRL, the Space Telescope and ISO, the remote exploration serial photogrammetric devices MOMS and MRSE as well as the materials scientific and bioscientific useful loads of the FSLP, D1 and D2 Spacelab missions impose requirements which cannot be met by traditional satellites. Today and in the coming years returnable systems are being employed which, however, permit only operational times of a few days (Spacelab, SPAS) up to a few months (EURECA) and are usable only in the shuttle or in the vicinity of the shuttle orbit. These limitations and the high cost of return to earth and relaunching demand as the next elementary step the development of space platforms and space laboratories which can be supplied and can be given maintenance while in orbit.

Columbus provides a consistent continuation of the new paths opened up by developments up to now in the domain of space platforms and useful loads (Figure 6). The goal of Columbus will be the further engineering standardization of the systems, more economical forms of operation, a wider field of applications and in consequence over the long term an increased commercialization of astronautics. The Columbus concept consists of the following elements:

1. a pressurized module for use as a laboratory, shop or space dwelling for astronauts;

2. a platform capable of maintenance which shall serve as a vehicle for useful loads which must be exposed to free space;

Programm (1)		Projekt (2)	Plattformtyp (3): autonomer Satellit (6)	Plattformtyp (3): Shuttle/SL SPAS-01	Plattformtyp (3): freifliegende Plattform (7)	Betriebskonzept (4): im Orbit wartbar (8)	Betriebskonzept (4): rückführbar (9)	Betriebskonzept (4): wiederverwendbar (10)
(11) D	Materialwissenschaften	MAUS		X			X	X
		Werkstofflabor (12)		X		X	X	X
		MEDEA		X		X	X	X
		Prozeßkammer (13)		X		X	X	X
		Einzelexperimente (14)		X		X	X	X
ESA		EURECA			X		X	X
(15) D	Biowissenschaften	LDEF			X		X	X
		NEXPA		X		X	X	X
		Einzel-Experimente (14)		X		X	X	X
ESA		SLED		X		X	X	X
		BIORACK		X		X	X	X
		ANTHRORACK		X		X	X	X

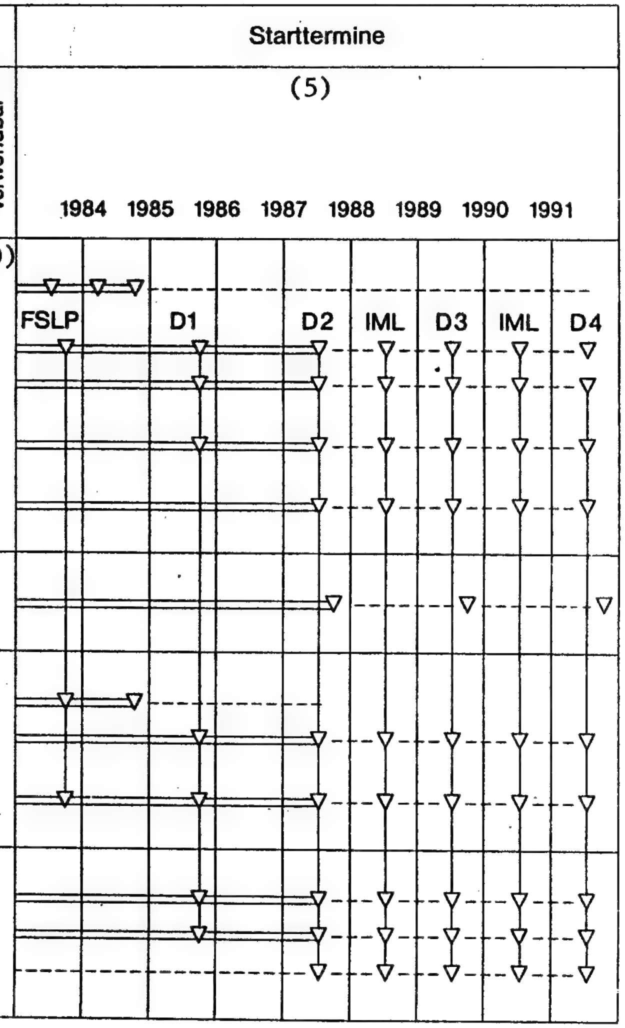


Fig. 4. German and European projects for weightlessness research (for explanations compare Figure 2).

Key:
1. Program
2. Project
3. Platform type
4. Operating concept
5. Launch date
6. Autonomous satellite

Key to Figure 4 (continued)

7. Freely orbiting platform
8. Maintenance possible in orbit
9. Returnable
10. Reusable
11. Materials sciences
12. Materials laboratory
13. Process chamber
14. Individual experiments
15. Biosciences

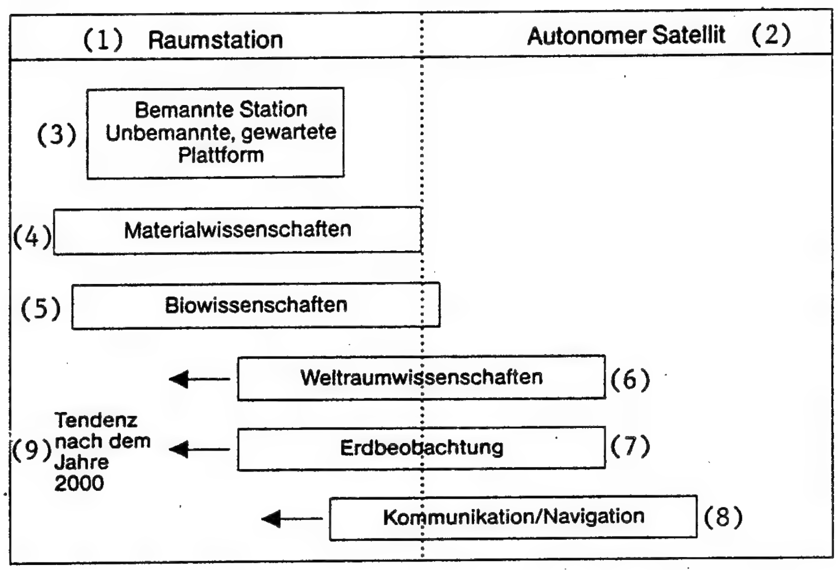


Fig. 5. Proportionate use of the space station by the individual disciplines.

Key:
1. Space station
2. Autonomous satellite
3. Manned station, unmanned, continuously maintained platform
4. Materials sciences
5. Biosciences
6. Space sciences
7. Earth surveillance
8. Communications/navigation
9. Tendency after the year 2000

3. a resources module for provision of auxiliary services for the free-flight phases of the pressurized module or for those platforms receiving maintenance. These auxiliary services would consist of energy supply, propulsion, attitude control, telemetry and telecommand system;

4. supply vehicle for the transport of material and men between the free-flying Columbus elements and the U.S. space station or the Orbiter Shuttle as a support point and also as a mobile maintenance device for the maintenance and repair of Columbus elements and satellites in orbit.

Thus Columbus makes available the basic elements of a module orbital infrastructure. These basic elements are usable for missions in all use disciplines and permit the following modes of operation:

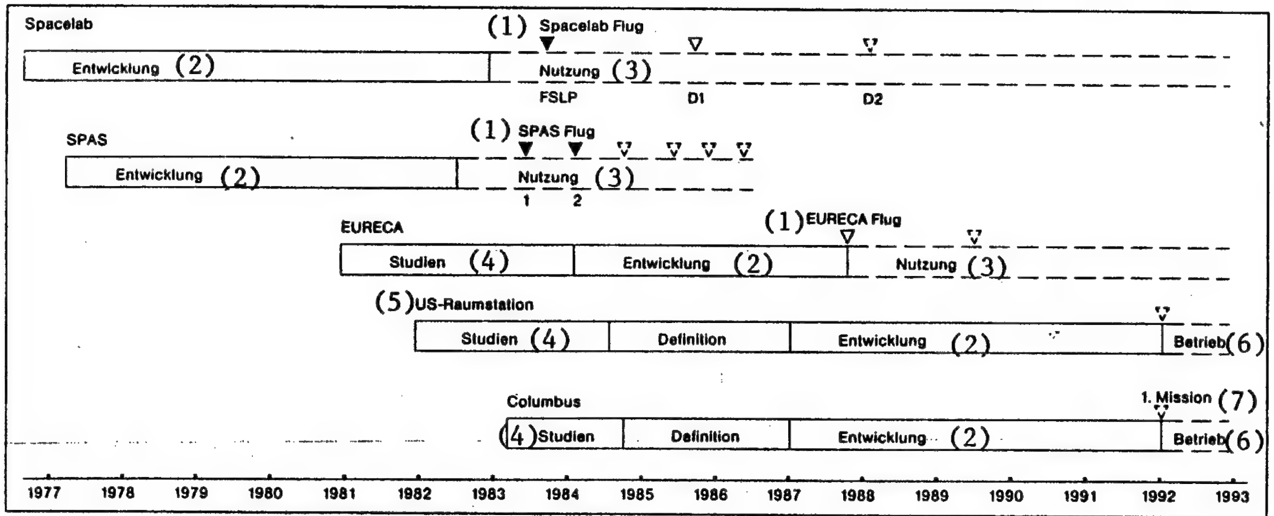


Fig. 6. Timetable for the astronautic programs (▼ = completed, ▽ = booked, ▽̇ = planned).

Key:

1. ... flight
2. Development
3. Use
4. Studies
5. U.S. space station
6. Operation
7. 1st mission

i. free flight in different orbits;

ii. operation as docked or integrated element of the U.S. space station;

iii. maintenance, repair, supply and unloading as well as assembly in orbit with the aid of the supply vehicle.

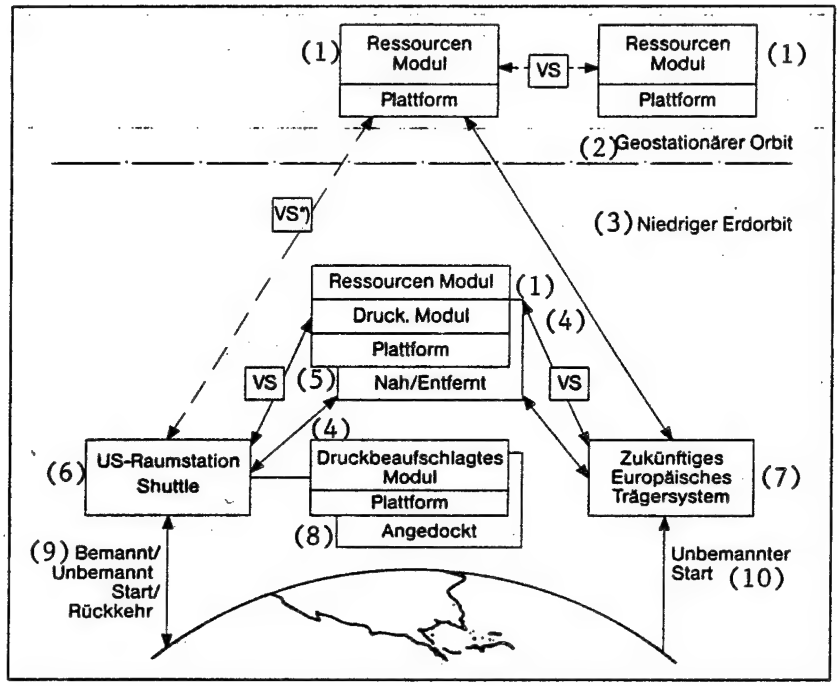


Fig. 7. Functional schematic of Columbus (VS = supply vehicle, VS*) = VS augmented by one transfer stage).

Key:
1. Resources module
2. Geostationary orbit
3. Low earth orbit
4. Pressurized module
5. Close/distant
6. U.S. space station shuttle
7. Future European vehicle system
8. Docked
9. Manned/unmanned; launch/return
10. Unmanned launch

Launching, and in particular cases the return, are accomplished as a rule with the space shuttle. Unmanned launches can also be carried out using a future European vehicle rocket system. Figure 7 shows schematically the functioning of Columbus.

Columbus Program Planning

The Columbus program involves the step-by-step development of the space segment, the organization of the ground segment for integration, testing, training, simulation and mission control and also involves demonstration missions in conjunction with suitable scientific or applications-oriented astronautic missions. The planning provides for carrying out a first demonstration

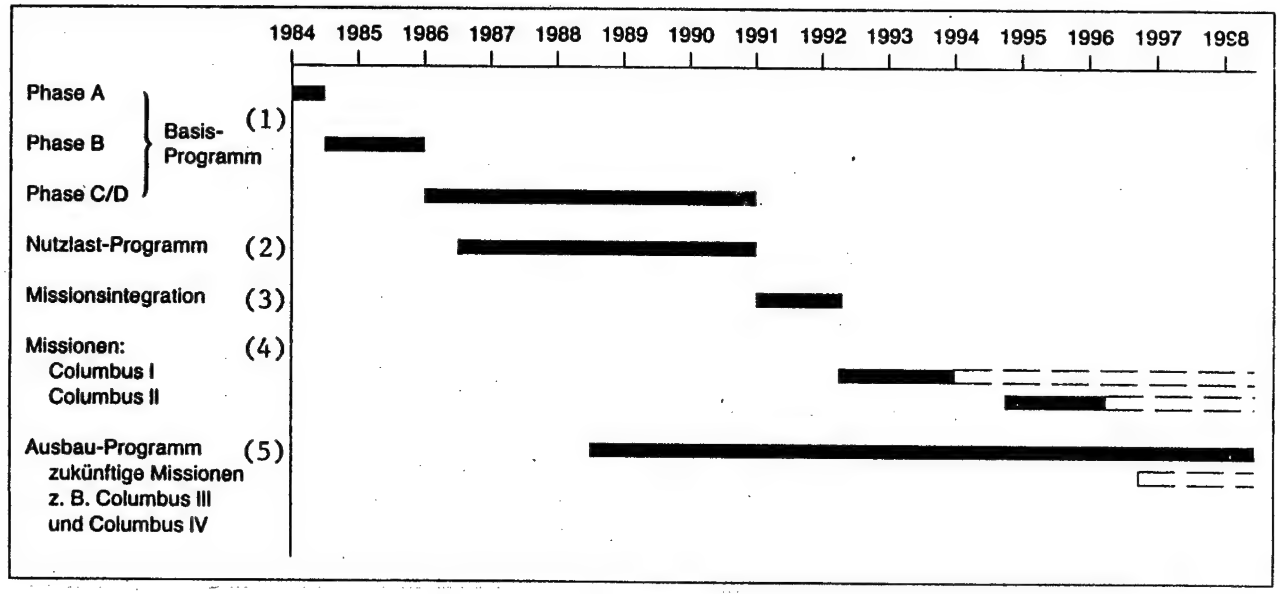


Fig. 8. Columbus program timetable (▬ = planned activities, ⊏⊐ = possible activities).

Key:
1. Basic program
2. Useful load program
3. Mission integration
4. Missions
5. Expansion program: future missions, e.g., Columbus III and Columbus IV

Element	(1) Betriebs-art	(2) Flug-gelegen-heiten	(3) Umlauf-bahn (Grad)	MAT			LIF					SPA										EOB								SCN			TOS				
				110	120	130	210	220	230	310	320	200	201	300	400	500	600	601	700	800	801	210	220	230	300	400	510	520	700	300	400	500	101	201	202	301	401
Druck-beauf-schlag-tes Modul (4) PM	Ange-dockt (6)	112	28.5	**XX**	**XX**		**XX**	**XX**	**XX**	X	**XX**			**XX**																	XX				XX		
		121	0	X	X		X	X	X	X	X																										
	Frei-fliegend (7)	122	28.5	X	XX		X	X	X	X	X																				X						
		123	57	X	X		X	X	X	X	X																										
Platt-form (5)	Gleicher Orbit/ angedockt (8)	212	28.5			**XX**	X	X	X	**XX**	X			**XX**	**XX**	**XX**				**XX**	**XX**								**XX**	X		X	**XX**	**XX**	**XX**	**XX**	**XX**
	Frei-fliegend (7)	221	0				X	X	X	XX	X			X		X																				X	
PF		222	28.5			X	X	X	X	XX	X			X		X	X															X			X		
		223	57			X	X	X	X	XX	X	X		X			X													X		X					
		224	90							X		XX	**XX**	X			X	**XX**	X	X		**XX**	**XX**	**XX**	**XX**	**XX**	**XX**	**XX**		**XX**		**XX**					
		226	(*)							X		**XX**					**XX**	X	**XX**																		

Fig. 9. Provisional mission model for Columbus elements ($\genfrac{}{}{0pt}{}{X}{X}$ with shading = selected model missions, $\genfrac{}{}{0pt}{}{X}{X}$ without shading = screening of model missions in terms of flight opportunities, x = possible alternatives for assignment of the model mission, (*) = eccentric orbits (different inclination)).

Key:
1. Mode of operation
2. Flight opportunities
3. Orbit (degrees)
4. Pressurized module
5. Platform
6. Docked
7. Free flying
8. Same orbit/docked

mission at the time when the U.S. space station is put into operation, in other words around 1992. At the present time the following demonstration mission sequence is anticipated:

1. use of the pressurized module as a docked or integrated element of the U.S. space station;

2. free-flying platform with maintenance while in orbit;

3. free-flying platform with assembly in orbit;

4. free-flying pressurized module carrying a crew during certain intervals of time.

Figure 8 gives a synopsis of the current timetable for the Columbus program. Figure 9 and the table show in detail the possible uses which have been identified for the Columbus demonstration missions.

Table: Provisional List of Model Missions for Columbus Elements

User Disciplines			Model Mission
1	Materials sciences	MAT 110	Materials sciences laboratory
		MAT 120	Microgravitation (manned, preoperational)
		MAT 130	Microgravitation (unmanned, preoperational)
2	Biosciences	LIF 210	Human physiological and medical research laboratory
		LIF 220	Human physiology and gravitation biology
		LIF 230	Human physiology and biological research laboratory
		LIF 310	Biological mission/zoology, biology, radiation
		LIF 320	Biological laboratory and space hospital
3	Space sciences	SPA 200	Geophysical observatory
		SPA 201	Geophysical environment of the space station
		SPA 300	Planetary research laboratory
		SPA 400	Solar observatory
		SPA 500	High-energy astrophysics observatory
		SPA 600	Space observatory (UV, optical and IR region)
		SPA 601	Interferometry (UV, IR)
		SPA 700	Infrared observatory (cooled)
		SPA 800	Radiotelescope in space
		SPA 801	Submillimeter telescope (cooled)
4	Earth surveillance	EOB 210	Land surveillance (optical, IR)
		EOB 220	Land surveillance (microwave, multipurpose)
		EOB 230	Land surveillance (microwave, agriculture)
		EOB 300	Ocean surveillance
		EOB 400	Atmospheric investigations
		EOB 510	Cartographic mission (geodesy)
		EOB 520	Survey of the gravitational field
		EOB 700	Instrument testing

Table (continued)

User Disciplines			Model Mission
5	Communication and navigation via satellite	SCN 300	Cartography and navigation
		SCN 400	Rescue services
		SCN 500	Interferometer mission
6	Astronautic technology and operational support	TOS 101	Docking technology
		TOS 201	Supply of free-flying platforms
		TOS 202	Manipulation and test equipment
		TOS 301	Satellite structures
		TOS 401	Test satellite for future technology

The Columbus elements are usable for European missions. This would be as international space laboratories and space platforms which could be profitably used by other nations for their own or for cooperative missions, as elements of the U.S. space station on the basis of purchase, mutual hardware exchange, licensing or cooperative use.

The achievement of the Columbus program can be made possible only through cooperation with the United States in its space station program since Europe lacks means for the transport and life support for men in space. On the other hand through cooperation with the United States Europe gets a chance at limited cost to itself to use the space shuttle and manned space station systems developed at great expense by the United States. Such European use would be for Europe's own research and for the development and testing of the new technologies and elements of a future orbital infrastructure. Whether this infrastructure will over the long term be manned or unmanned cannot be decisively determined in our present state of knowledge. Therefore the Columbus program constitutes a logical necessary step on Europe's road to increased use of astronautics for scientific and commercial purposes.

8008
CSO: 3698/540

BRITISH BREAKTHROUGH IN LIGHTWEIGHT LITHIUM BATTERIES

Aarau ELEKTRONIKER in German Jul 84 p 103

[Article by C. L. Boltz: "Breakthrough in Electric Batteries"]

> [Text] The Research Institute of the British Atomic Energy Establishment in Harwell, near Oxford, has succeeded in making a new rechargeable battery which produces three times the power of a lead-acid storage battery and weighs only one-third as much.

The research carried out in this area has been going on for years in many countries; naturally, new batteries have been introduced, while others are still in the development stage. The real difficulty was in finding a solution through which the high weight of lead-acid storage batteries could be reduced, or to develop dry batteries with a longer storage capability.

Volta Was Not Familiar with Lithium

Almost 200 years ago Volta produced the first electric cell for generating current, but when the zinc-carbon battery became available for everyday use further research almost came to a standstill. But it has always been a dream to own car batteries that could not run down. This dream has now been realized at Harwell.

The electromotive (electrochemical) series--with the elements belonging to it in the order of their reactivity--is generally familiar from school. The electrochemical series is headed by lithium, the most reactive element. Until a few years ago, the process required for the manufacture of this substance was not well developed enough to derive the corresponding benefit from its characteristics. Lithium has to be manufactured in an absolutely dry, oxygen-free atmosphere and, because of its reactive nature, it is extremely difficult to enclose it in a cell.

Difficulties Overcome

The scientists working at Harwell have now overcome this and other difficulties and produced the cell they call the "Harwell Battery Module."

Solid electrolytes in the form of a ceramic material that is porous enough to be ion-permeable have been known for some time. The scientists at Harwell succeeded in producing the electrolytes from a polymeride which consists of polyethylene (suffused with a mixture of lithium, fluoride, carbon and a trace of sulfide molecules). The anode is lithium and the cathode is a mixture which contains, among other things, vanadium oxide.

The "Secret": a Thin Electrolyte Layer

In a battery cell, the fact that less resistance has to be overcome with a thin electrolyte layer is of special importance. It follows that a connected circuit can be supplied with greater energy. At the same time--in proportion to the electrolyte surface--the strength of the current as a whole and consequently the power can be increased. The Harwell scientists took this fact into account and made the individual components from very thin foil sheets, stacked in a particular sequence.

The composite foil sheets produced in this way, which are less than 0.1 mm thick, are wound into flat spirals, which increases the reaction surface. Another possibility is to form the foils into flat squares or zig-zag shapes.

A module of this kind can generate electrical work of 1.44 kWh, while a normal 6-volt car battery gives off only 0.48 kWh.

From the Automobile to the Microcomputer

Development work is continuing. Industry is interested in using Harwell Battery Modules not only for automobiles, but also for toys, electrically driven tools, etc. In addition, the use of a highly miniaturized version of these modules as a microbattery on silicon chips is predicted. Such great importance is attached to the research work that it is being supported both by the British government and by the EEC commission.

9581
CSO: 3698/579

FRANCE'S USE OF CRAY 1, PLANS FOR NATIONAL SUPERCOMPUTER

Need to Master Supercomputer Technology

Paris LES ECHOS INDUSTRIE in French 20 Jun 84 p 11

[Article by Jean Deflaceliere (Investigation by Anne-Marie Blanchet and Gilles Saint-Salvi): "Supercomputers, A Vital Stake, Laudable But Insufficient Efforts"]

[Text] Some time ago, when the Minister of Industry and Research was explaining to some scientific journalists why he had kept the file on the electronic chain to himself for so long ("to understand it thoroughly"), I took the opportunity to ask him the following question: "Do you believe that it is vital for France to master supercomputer production and, if so, what do you plan to do so that we can make up for our delay in this area?" His answer: "What is a supercomputer?" justifies our dedicating this study specifically to him. Here he will learn especially the following facts:

1. No country can expect to maintain a first rate place on the leading edge of scientific, technical or military research (aeronautics, nuclear, highly integrated electronics, petroleum research, weaponry, chemistry...) if it does not have computing power equal to that of its competitors. Supercomputers constitute a vital stake.

2. France has fewer supercomputers than Great Britain or German and all of its systems are imported from the United States.

3. The American monopoly in the marketplace has two major consequences: our supply depends on political considerations (5 month embargo at the time of the Siberian gas incident); the systematic lag in deliveries of very high performance machines constantly penalizes our research and our industry.

4. When our researchers finally, with great difficulty, obtained their first supercomputer, the officials of the ministry involved required them to use a completely French "front-end" (a sort of pilot computer), that is, a machine designed and manufactured in the United States, but relabeled in the Hexagone, and to which it was necessary to add an IBM and software written partially in England. The whole package certainly cost much more than the plan envisioned by the technicians.

5. France purchased its first supercomputer in 1981, 5 years after its marketing in the United States, and should produce its first national machine in 1986.

6. Our Isis supercomputer would then be the equivalent of hardware of the present generation, but about 5 times less powerful than its American competitor, which will have come out 2 years earlier, and 25 times less powerful than the computers expected in 1987.

7. Isis would then have only a slight chance of penetrating any market other than protected ones (national defense) and to make the committed investment (Fr 1 billion) pay off.

8. The American leader posts a net profit of 15 percent for itself. Even though it occupies a highly competitive position in its own country and in spite of very clear technical progress, this manufacturer invests twice as much as France in research and development.

9. As laudable as it is, our national project inspires doubts in many specialists. They wonder if committing considerable but seemingly insufficient resources to the job will not ultimately result in throwing the money away.

10. Does France really have the resources and the market necessary to throw itself into such competition alone? Wouldn't it be better to approach supercomputing, like space, on a supranational scale? Research groups have recommended a European program. Their file, delivered to the Ministry of Industry in August 1983, still is awaiting a response.

Number of Supercomputers in France

Paris LES ECHOS INDUSTRIE in French 20 Jun 84 pp 12-13

[Article by Anne-Marie Blanchet: "Supercomputers, France: Obvious Delay, Dispersed Efforts"]

[Text] Hardly 8 years after the appearance of the first supercomputer, it is necessary to admit that France has missed the boat. At the end of 1982, only EDF (French Electricity) and CISI (International Computer Services Company, a subsidiary of CEA) were each equipped with one of these giants, which cost the paltry sum of $10 million.

The General Geophysical Company, Elf-Aquitaine and an economic interest group which unites research organizations have since joined this very exclusive club. The Atomic Energy Commisariat, for its part, has acquired two machines. Control Data has also opened a self service computer center at Marne-la-Vallee.

In spite of this spectacular leap forward which brings our holdings to 8 units, our number of systems remains inferior to that of Germany and England, with a

dozen machines each. As for the Americans, they already have about 60, a fact which does not keep them for complaining about their system shortage, especially in the research sector. We can console ourselves with the thought that Japan has fewer than ten supercomputers, but the Japanese are determined to compete.

There is actually a French supercomputer plan, but it will not produce results until 1986, and until then all our systems will have to be imported.

Responsible for carrying out our national project, Bull company has, it seems, a troublesome tendancy to disperse its efforts. It has, for example, invested some $10 million in the American firm Trilogy to acquire rights to "wafers", new very high integration components. A laudable initiative, certainly, but a very poor choice: unable to obtain the anticipated results, the American company has just abandoned its project.

As if this lesson were not enough, Bull has recently signed an agreement with the Japanese firm Nec to import and resell supercomputers better adapted to its product line. We will know within 3 years whether it was wise to put all our eggs in one basket in this way.

In spite of an obvious delay, our position is not however desperate. We have in fact certain trumps capable of rectifying our situation. CISI thus enjoys an enviable position because it is one of only 5 service companies in the world selling time on supercomputers (there is 1 Japanese and 3 American competitors).

French industrials can thus meet their needs which do not justify fulltime use of a supercomputer of their own. But in order for our rare strengths to produce their maximum yield, we need to support them with an adequate financial effort and to bring all the synergies into play. This makes it even more difficult to understand why CISI, which has first rate capabilities in the supercomputer area, is deliberately excluded from our national project.

Need for European Cooperation

Paris LES ECHOS INDUSTRIE in French 20 Jun 84 p 14

[Text] The French Marisis project is already too far advanced to lend itself to international cooperation. On the other hand, nothing stands in the way of setting up a more ambitious project which would cross the 1,000 megaflop threshhold. Such a program, which would imply enormous investments, would be hard to imagine without European cooperation.

By putting their own supercomputer on the bargaining table, French computer scientists would enjoy a position of strength. The problem is that no European government now seems to realize the necessity of giving Europe a supercomputer capacity comparable to that of the United States or Japan.

Convinced that it is necessary to react now or never to the American-Japanese monopoly, many researchers have banded together, under the initiative of several

Toulouse groups, to recommend the creation of a European Center for Research and Advanced Study for Scientific Calculation (CERFACS). This should be equipped with the most sophisticated hardware available on the market.

From there, European specialists would meet to formulate basic programs, or new languages. After that, researchers and industrials could work on adapting this software to their individual needs. In addition, 90 permanent researchers would have the charter of training about 100 persons per year. Depending upon the course of study chosen, these people might stay for as long as 6 years at the center participating in its research. A final goal set for CERFACS: to design and to develop machines much more powerful than present supercomputers but... dedicated to a single application. The researchers recommend an organization of the "European Agency" type (like Ariane) and project a requisite annual budget of Fr150 million.

The proponents of this project presented their file to the Ministry of Industry in August 1983. More to follow...

Research Projects on Cray 1

Paris LES ECHOS INDUSTRIE in French 20 Jun 84 pp 12-13

[Text] French researchers received their Cray 1 in 1983, or 7 years after its first implementation in the United States. The system was practically obsolete at the time of its installation since the American manufacturer is now prosposing Model XMP, four times more powerful than its predecessor. Also, the "GIE (Economic Interest Group) Research", which met to discuss this on last 4 June, unanimously decided to replace its systems.

At present, the supercomputer is running at two-thirds capacity, and when the national meteorological service fully utilizes its shares, starting in July, it will be in full use. The GIE administration will then set up a balance sheet of the results of the roughly 350 research projects using the machine.

For now, the machine is leased, but its users hope to purchase their next system. To that end, they will put the Americans and Japanese in competition. "Although computer capacity needs double every 2 and 1/2 years, we cannot change equipment at that rate. We therefore have no margin for error."

"In spite of compatibility problems, and if the economic incentives prove to be strong enough, we will not rule out turning to another supplier, or even choosing totally different hardware," stated Tor Bloch, computer center director.

The center is operating this year on a budget of Fr57 million excluding taxes. The scientific council, made up of about 10 members with quite diverse backgrounds, meets once a quarter to consider an average of 80 projects. Some of them extend over several months, sometimes over more than a year.

They must be submitted 2 months before each meeting, but, after deliberation, waiting periods do not exceed one week. The center funcitons with a staff of about 30 people. An assistance group of 6 researchers has already trained 250 users who have each taken a week of courses.

GIE Research

Users	Percentage	Research
CNRS (National Center for Scientific Research)	25%	
National Education	20%	
Ecole Polytechnique	10%	63%
INRIA (Expansion unknown)	8%	
General Armament Management		5%
ONERA (aeronautics) (National Office of Aerospace Study and Research)		10%
CISI (International Computer Services Company)		10%
Weather		12%

The computer center operates with a staff of 30 and a budget of Fr57 million.

Breeder Reactor Calculations

Paris LES ECHOS INDUSTRIE in French 20 Jun 84 p 18

[Text] Supercomputers have opened the way to three dimensional calculations, especially in aerodynamics and fluid mechanics. That's how it is now possible to study, with the aid of vectorial computers, a phenomenon which is still inadequately understood: the "dynamo effect".

Its theory rests on the following hypothesis: putting a fluid in motion results in the produciton of magnetic energy of more or less significant intensity. Some people explain the existence of the earth's magnetic field by the presence of moving liquid iron within the earth's core.

This phenomenon disturbs scientists; it leads to something significant: in breeder reactors such as Super-Phenix, cooling is accomplished by means of liquid sodium in motion. It is then to be feared, if this theory is correct, that magnetic fields may be created which are capable of disrupting the electronic circuits which control the operation of the power station.

Although the Soviets are very interested in this phenomenon and claim to have verified it de visu, an experiment is planned for the month of August on Super-Phenix. This should end the discussions.

Access to Supercomputers in France

Paris LES ECHOS INDUSTRIE in French 20 Jun 84 p 18

[Text] If you frequently need to solve complex scientific problems, perhaps their solution passes through a supercomputer.

But how can yu get the use of one? In France there is a Cyber 205 at the Control Data Center at Marne-la-Vallee. An engineering school at Lyon, the INSA (National Institute for Applied Sciences) is now connected to this supercomputer by means of the Cybernet network. The school uses it to perform complex calculations for industrial work applications.

Cray owners are not numerous: two military, EDF (French Electricity), Elf-Aquitaine, General Geophysical Company, the Ecole Polytechnique (representing "GIE Research"), ONERA (the National Office of Aerospace Study and Research) (constantly) and the CISI.

It is the Cray-XMP, owned 50/50 by the CISI and Framatome that anyone (or almost anyone) may use. One must first contact the owner who will send out a market engineer responsible for evaluating client needs. Then a user code and a password are assigned to the client to permit access to the network.

There are two possible ways to actually work: Either the client goes to one of the CISI agencies located in large French cities or to the access points established in French or foreign subsidiaries of the company.

Or he installs on his own site a terminal linked directly to the network by a permanent line of Transmic, or by the telephone switching network, with a terminal-modem which can be furnished by the user. Access to the supercomputer is then as simple as programming a video tape recorder.

Billing is figured by time share units, fairly flexible entities and of quite variable amounts according to the nature of the jobs required.

CISI: 35, boulevard Brune, 75680-Paris Cedex 14. Ph. (1) 548-90-00.

Control Data: 27, cours des Petites-Ecuries--BP 139 Lognes 77315 Marne-la-Vallee Cedex 2. Ph. (6) 005-92-02.

Nuclear Applications

Paris LES ECHOS INDUSTRIE in French 20 Jun 84 p 17

[Text] The Cray-XMP installed at the CISI is owned 50 percent by Framatome. The initial benefits expected by the nuclear manufacturer are productivity gains. Engineers now spend their time on more interesting tasks that the perfecting of software, since their machine is synonomous with the highest levels of performance. In spite of the rather high price of a vectorial computer, the engineer-hour is now reaching such heights that the investment is undeniably profitable.

Nuclear applications running on supercomputers are numerous: it is already known how to simulate accidents involving loss of coolant (pressurized water which gushes out from the core of the reactor), to develop compact high density storage of irradiated fuel, to complete the integrated study of the nuclear area where the fission reaction takes place and the thermohydraulic area where the heat given off by the reaction is collected.

The geographic location of certain clients, such as Korea or China, calls for earthquake resistant stations. Simulations of shocks are run on supercomputers, varying parameters (location of epicenter, strength of shock) following existing regulations.

There is another particularly profitable application: each year the reactor is shut down for about a week to renew the uranium assembles according to their amount of wear.

Use of a supercomputer to evaluate this wear more rapidly would doubtlessly reduce the down time of the reactor: at 15 centimes per kilowatt hour, it is easy to verify that one day down at a rate of 900 megawatts (yield 90 percent) comes to nearly Fr 3 million!

Framatome: Tour Fiat, 1, place de la Coupole, 92084 Paris--La Defense Cedex 16. Ph.: (1) 796.14.14.

Missile Testing

Paris LES ECHOS INDUSTRIE in French 20 Jun 84 p 17

[Text] There are two possible ways to test missiles. The first, uncertain but effective, is their use on terrain in a real situation: thus the Exocets of Aerospatiale were given large scale publicity at the time of the Falklands War.

The second, less spectacular, is the wind tunnel test: unfortunately, the cost of an hour's wind tunnel use now has reached astronomical heights. And the model must be "thought out" for a long time in the most specific detail before any

test. To do this Matra engineers are using, you might have guessed, the benefits of data processing.

However, aerodynamic calculations deal with complex problems, such as the simulation of incompressible flow: to solve all of them, a large computer is almost essential for each engineer!

That's why, here again, the supercomputer fills the role perfectly: it calculates missile trajectories and performance, defines their aerodynamic characteristics, their pitch and roll movements during flight, the constraints applied, etc.

The use of the Ecole Polytechnique's Cray (before that of ONERA, shared with Dassault, the SNIAS and the SNECMA) reduces wind tunnel costs by about 80%.

Matra, 37, avenue Louis-Breguet, 78140 Velizy Cedex. Ph. (3) 946-96-00.
12666

12666
CSO: 3698/554

MULTINATIONAL PROGRAM TO DEVELOP INTELLIGENT ROBOTS

Program Announced

Paris AFP SCIENCES in French 19 Apr 84 pp 1-2

[Unsigned article]

[Text] Paris--French researchers and manufacturers will cooperate on the creation of a number of autonomous multipurpose robots (RAM) to be used in a large variety of environments. The official launching of this program was announced on 18 April by Yves Stourdze, secretary general of the task force "Technology, Growth, Employment" (TCE), established by a decision of the heads of state and government who met at the Versailles Summit Conference in June 1982.

The RAM program is aimed at third generation robotics, namely "intelligent," generally mobile robots, which relieve workers from difficult, dangerous, or toxic tasks; it is one of the 18 projects defined by the TCE group, eight of which are managed or co-managed by France (fast neutron reactors, biotechnologies, food technologies, and so on).

RAM is managed by France and Japan, but each of the countries participating in the program (the United States, Great-Britain, Italy, FRG, and Canada, as well as the EEC and Austria as observers) are launching their own finalized programs, seeking the maximum possible number of cooperations.

In France, about 60 manufacturers and 20 research centers have answered the nationwide call for bids on the RAM program. Seven well defined projects (or sub-programs) have been specified, and a public interest group (GIP) is being formed for their implementation.

The seven projects and their specific applications are:

1) Construction of an autonomous multipurpose robotized nuclear intervention system (SINRAM), managed by the AEC, focused on the development of two machines: a light one, capable of threading through the mazes of power plants or other plants for inspection purposes, and another, consisting of a much larger mobile assembly, capable of performing a number of tasks (cutting, welding, assembly, and so on).

2) Construction of a workshop autonomous multipurpose robot (RAMA), conceived as a sort of mobile assistance for a mechanical shop equipped with conventional machines. It is managed by 12L (a group of seven light machining PMI--small and medium-sized enterprises).

3) Construction of mobile cleaning robots for industrial cleaning. They could for instance, be used to clean RATP buses, a job which is now performed manually by night shifts at 23 depots on 4000 buses. The program is managed by Midi-Robots.

4) Managed by CERCHAR (French Coal Mines Research Center), this project seeks to build a mining robot for cutting, transportation, and support. The final objective is to place on the market an ore cutting robot capable of moving with no intervention along a face, of penetrating a vein as a function of its thickness, and so on.

5) The project presented by COMEX (Maritime Survey Company) concerns an autonomous underwater vehicle, and robotized assistance tools designed to increase the productivity of divers, as well as to improve the efficiency of underwater support ships.

6) In agriculture, the project managed by Cotraitance-Aquitaine consists of a study for an autonomous universal forestry robot (RAFU), which could perform such tasks as brush clearing, pruning, tapping (resin harvest in Landes), and so on.

7) The last project, managed by Renault automation, proposes to study an autonomous multipurpose robot for household use, the RAMPED, which would be a consumer product, and for which a significant market could be predicted beginning next decade. This household robot would be used to handle light loads, for transportion (plates at meals), or as a service module (vacuum cleaner); it could include surveillance devices, and so on.

Commentary

Paris ELECTRONIQUE ACTUALITES in French 4 May 84 p 4

[Article by HP]

[Text] The manufacturers which participated on 18 and 19 April in the "European Cooperation on Robotics" workshop organized by CESTA in collaboration with AFRI (French Industrial Robotics Association), expressed the need to find commercial or industrial partners.

But until now, with very few exceptions, we are forced to observe that agreements have been reached only with American and Japanese companies. Will the launching of the RAM project (see ELECTRONIQUE ACTUALITES of 27 April), and the Esprit computer integrated manufacturing (CIM) program, help establish

a meeting base for European partners in robotics? Without being a cure-all, in the eyes of some of the participants these programs could offer an opportunity for researchers on one hand, and manufacturers on the other, to become better acquainted with their counterparts in the EEC countries.

With an inventory of 12,500 robots in Europe, compared to 16,500 Japanese and 8000 American robots, the old world is still in the race. But it is in production and sales that Europe shows its weakness. While such manufacturers as ASEA produce 100 robots per month, and Volkswagen produces 50, the figures drop radically to eight for AKB and even less for SCEMI, whereas the production of Japanese manufacturers remains at a minimum of about 70 units. These figures will increase, since SCEMI plans to build 100 robots in 1984, compared to 30 in 1983, but the Japanese robot industry will also undergo a similar growth, with the major advantage at the start, that it covers an international market with a strategy to match, while the European companies are generally only of national magnitude.

In recent years, only two out of 47 cooperation agreements among EEC roboticists were signed between European partners. It would thus seem that manufacturers as well as researchers are ignoring their partners in the EEC. The Esprit program, which devotes 950 man-years, or $315 million, to CIM for the next five years, will certainly cause Europeans to collaborate, but will not prevent the search for cooperations with American or Japanese partners since the manufacturers need immediate solutions.

Moreover, the opening of the American market resulting from such a cooperation, constitutes a sort of consecration for the manufacturers. Given the many barriers they encounter on the European market they in fact cannot build products to compete with those of manufacturers accross the Atlantic or Pacific oceans.

According to the meeting's participants, hindrances can be found at various levels: legal, personnel and capital traffic, standards, and generally speaking, the lack of an European statute. The controversy on standards is generated by the fact that test machines differ from one country to the next.

For Joel Le Quement, of CESA, author of "The Factory of the Near Future," standards in robotics have formed the basis of a true strategy in Japan from the time they were implemented in 1974. Legalized after being studied by JIRA committees, these standards apply to all aspects of robotics, from language to modular assembly structures.

Cooperation to What Point?

Up to what point are European manufacturers ready to collaborate among themselves? The French company AFMA-Robots, subsidiary of Leroy-Somer and Telemecanique, which employs 42 people, would consider a bilateral cooperation with a partner of the same size, to provide complementary products. If negotiations were to occur at the European level, the two partners would carry them out jointly. AKR, second largest producer of painting robots in the world, is seeking a German partner for exportation to FRG.

The German GDA, created two years ago and specializing in control (20-30 robots per month), is looking for a cooperation in the field of robotic environment, with a view to developing and selling systems. Similarly, this company would like to obtain sales agreements with companies operating on the same markets with products that are not in direct competition.

The British company John-Brown would like to reduce its research and development costs and increase its sales through cooperation. Moreover, this company is also seeking a partner specialized in peripheral equipment. As for SCEMI, of the Alsthom-Atlantique group, specializing in precision assembly robots and expecting to employ about 100 people by the end of 1984, it would like to reach agreements with engineering enterprises to sell its robots directly or in integrated packages.

11,023
CSO: 3698/575

BRIEFS

ITALIAN ROBOT FOR AUTO INDUSTRY--Collaboration between Alfa Romeo and the Politecnico di Milano for the development of advanced technologies. At the department of mechanics in the Politecnico di Milano a new robot prototype has been developed. It is called "Gilberto"; it features 6 degrees of freedoms, is activated by electric motors, has a relatively simple mechanical transmission, and software control from a microcomputer. Alfa Romeo, though its research department, contributed to the feasability study and the application development of this sophisticated product, applying for a patent for the technological innovation of the mechanical structure control, in which professor Rovetta of the Politecnico collaborated. The application of the research robot in the automotive field was viewed by Alfa Romeo's research department as a link between the industrial product and the scientific study, which in turn allows one to preview the function of robots in the future. The link between the laboratory robot, jointly developed by the Politecnico of Milan and Alfa Romeo (Auto) and the final industrial product is very much in evidence. The industrial product is made up of the Cincinnati T3726 robot, which in the robotic operation involving shavings removal on engine blocks, gave evidence of its high application flexibility, derived from 6 degrees of freedom, together with an exclusive triple joint wrist action. Such characteristics allow for advanced capabilities even in cases involving restricted workspace or particularly high demands on precision. These robots are also provided in totally automated systems by the Mectron Robotica Techologica Company, involved in automation activities dealing with mechanical jobs (soldering, refinishing, holing, shaving, linking and handling). In fact, the Cincinnati robot, which has the reputation of being one of the most sophisticated and reliable machines, together with the lab robot, can be connected together, with an exchange of information and data on the course to be chartered, which in turn is provided by computer imput. [Excerpts] [Rome NOTIZIARIO DELL'ENEA in Italian Apr 84 pp 70-71] 9209

CSO: 3698/561

FRG DEVELOPS NEW KIND OF SENSOR FOR MICROELECTRONICS USE

Duesseldorf VDI NACHRICHTEN in German 13 Jul 84 p 10

[Article: "Micromechanics Yields Innovative Sensors"]

[Excerpts] For decades a purely electronic technology has been pushed farther and farther; and then, after it appeared to be fully matured, developers hit upon the idea of using precisely the method used for chip building to produce mechanical parts.

At a press conference of the Fraunhofer Society (FhG) in Munich, journalists recently learned that the Division for Microstructural Technology of the Munich Fraunhofer Institute for Solid-State Technology--which is active in Berlin working on the Berlin electron storage ring for synchrotron radiation, called Bessy--has been working the field of micromechanics for several years. The initial task undertaken--supported by the BMFT--was the development of integrated and miniaturized sensors for measuring the mechanical quantities, force, pressure, acceleration and sound. Sensors of this type are a fundamental prerequisite for microelectronics to find broad application in instrumentation, guidance and control in the future, according to FhG thinking. Of course, they will have to be reasonably priced and the output signals will have to be electronically compatible.

Within the scope of this work, a variety of micromechanical structures have been generated including tiny cantilevered and clamped-ended beams. These can be used to measure vibration, shock and acceleration; and they can also serve as microscopically small microphones. Consider also: If a coating is applied to the beam and if the coating changes its length as a function of humidity, thereby bending the beam, then a humidity measurement can be made. And finally, according to the FhG experts, the clamped-ended beams can be used for temperature and flow measurements.

Now, just what are the geometric sizes of these micromechanical chips? The silicon element (the chip) contains a groove with a length of 1 mm, a width of 0.3 mm and a depth of 0.02 mm (20 micrometers). Above this groove 18 cantilever beams were etched from the material. They are between 40 and 200 micrometers long, 20 micrometers wide and a mere 2 micrometers thick. The last measurement corresponds approximately to the line structures of very modern semiconductor chips. And in spite of these filigree dimensions the new structures will exhibit "high mechanical stability" and permit the production of "very robust components" for many applications, according to the FhG institute.

9160
CSO: 3698/546

PLESSEY INTRODUCES NEW 'STANDARD' MAGNETIC BUBBLE MEMORY

Leinfelden-Echterdingen EEE in German 10 Jul 84 p 34

[Text] Magnetic bubble memory technology, used until now predominantly for military applications, is now accessible to broader groups of users as the result of a new development from Plessey Microsystems: with the PBU 85 E standard bubble, which Plessey is just announcing, a universally employable nonvolatile memory with up to 512 KB capacity is now available.

The employment of magnetic bubble memories on a broad basis has failed in the past because of economic considerations. The newly developed standard PBU 85 E now makes it of interest for many industrial applications.

Magnetic bubble memories exploit the potential--not discovered until the mid-1960's--of forming cylindrical "bubbles" in thin sheets of ferrimagnetic material, which are only 5 in size and whose magnetization can be influenced in a defined way. Since the "bubbles remain magnetically stable, they can be used as nonvolatile memories. The manufacture of magnetic bubble memories, which uses a combination of magnetic and minute permalloy strips, is extremely costly, primarily because of the complicated controller unit.

What makes these memories so valuable is the fact that no type of mechanical motion is needed any longer to call up data. The absence of mechanical parts means in practice: freedom from wear and maintenance, a high degree of reliability and high MBTF (mean time between failures). It is about 50,000 hours--many times more than the MBTF of mass memories with moving components--and the anticipated life span is more than 10 years--without any preventive maintenance.

The PBU 85 E is equipped with a serial interface and emulates the DEC TU 58 tape system. As a result of microprocessor control, the magnetic bubble memory is programmable for most other current standards. Access time is 75 ms per data block, the rate of transfer is adjustable between 75 Baud and 38,400 Baud.

The housing of the new Plessey memory unit is extremely shallow and, from the point of view of space, it offers an attractive alternative as an add-on mass memory.

9581
CSO: 3698/579

FRG RESEARCH ON COMPOSITE MATERIALS, COLUMBUS PROGRAM PUBLISHED

Cologne DFVLR-NACHRICHTEN in German Jun 84 p 58

[From a report listing series: New Research and Development Results From DFVLR Managed Programs]

[Text] The research and development work is financed by funds provided by the Federal Ministry for Research and Technology and the Federal Ministry for Labor and Social Order.

Order A-series reports through: DFVLR, Program Management Area, Section PT-AV, PO Box 906058, D-5000 Cologne 90

Klug, J. and K. Kaiba, M.A.N., Munich

Joining Technology for Graphite-Fiber Reinforced Structures--Phase 3 (Parts 1 and 2), (Final Report).

Report A 4628, 246 pages, 79 figures, 42 tables, 49 references

Within the scope of BMFT funded programs, appropriate joining methods and load introduction methods were worked out and qualified for tension-compression struts and shell structures made of fiber reinforced composite materials, primarily graphite fiber reinforced plastic materials (CFK). The design principle for CFK struts permits a broad spectrum of applications and exhibits as an additional advantage, the realization of a positive-locking, highly reliable, low weight connection between a metal lug and a CFK tube. A practical CFK sandwich shell with laminated-in CFK ring flanges (ARIANE booster rocket) was developed. With this construction method, strength and stability requirements are fulfilled with minimal weight. When such parts are manufactured with precision CNC fiber winding methods a uniformly high quality at a comparatively low manufacturing cost can be expected. The advantages were checked on a prototype shell and confirmed with a static load test.

Lippe, M. v.d., and J. Spies, MBB/Erno, Bremen
Future Spacelab Utilization Program Columbus (Final Report, in English).
Report A 4636, 270 pages, 19 figures, 112 tables

In the study a program was developed that progresses stepwise from a pay-load laboratory fully dependent on the U.S. space station to an autonomous system with several elements. In the final phase the U.S. space station is only required for logistic tasks. The U.S. Space Transportation System (STS) is planned as the transport system with possible unmanned flights of the Ariane V.

9160
CSO: 3698/546

SCIENTIFIC AND INDUSTRIAL POLICY

ITALY DISCONTENTED OVER ALLOTMENT OF ESPRIT FUNDS

Rome L'ESPRESSO in Italian 1 Jul 84 pp 145-146

[Article by Maria Grazia Bruzzone: "From Brussels Without Love"]

[Text] The EEC has earmarked many billions for research. Italy however, will receive few.

In compliance with the time deadlines demanded by the ESPRIT (European Strategic Program of Research in Information Technology), the project for advanced data systems is taking on shape. In 10 years it is supposed to guarantee Europe technological parity with the Americans and the Japanese, and begin to yield profits and operational activity.

One year following the launching of the pilot phase, four months after the initiation of the "Main ESPRIT" by the ministers of industry and research, the final selection from among 444 research projects which have arrived in Brussels from all over the world (as many as 280 from Italy) can be said to be finished. The final touches will be applied at the beginning of July, and by the end of the month the die will be cast and the funds allotted. Whether they be few or many, common allotments will cover only 50 percent of the value of each project, for a total of 1.025 billion lire during the first 5 years, with an average of 200 billion per year.

Italy, which contributes 15 percent to the Community fund, should in proportion get about 30. "They will most probably be fewer than that," parry the Italian representatives. "We will be happy if we can get 13 percent." Who will get the projects?

On the list there are names and figures; but a word of caution. ESPRIT is involved in transnational projects and has many partners, such as a head commissioner, for example, and a working time frame of between 1 and 5 years. Also, there are "A" projects, the strategic ones, and the""B" type, of minor importance. Italy is involved in 42 programs and manages 14, a number drastically reduced by the 5 international adjudicating commissions. However, the companies and organizations have multiple projects assigned to them and in all, they number about 30.

Olivetti and IRI [Industrial Reconstruction Institute] share the first place in the number of total value of the projects, each with 13+ million ECU's contributed by the EEC, equal to 18 billion lire. Olivetti is

advancing in the field of modern office automation, with 9 projects, all of the first category. In the national state group, the STET [Telephone Finance Corporation] enterprises come to the fore: ELSAG, ITALTEL, Selenia, and above all CSELT [Telecommunications Research and Study Center], involved in 5 projects, of which 3 as main contractor, ranging from integrated circuits to Videotex photography codification. Five million ECU's are set aside for IRI's other enterprises: SGS (integrated circuits), Ansaldo, Italicantieri and Italcad.

Of lesser quantity but of high caliber are FIAT's contributions: two for COMAU (software for automatic production and research for robot management) and one for TELETTRA (micro-circuits) for two main contractor slots and 3.5 billion lire.

ENIDATA will receive 1.5 billion to work on projects involving advanced programming projects and new systems used to query data bases. The head contractor job will go to CRAI, a research consortium linked to the University of Calabria. And it is not the case that only big name companies are assigned some of the programs. System and Management, a subsidiary of Banca Nazionale del Lavoro will undertake analogous research on dialogic system data bases; Delphi, the Viareggio concern linked to the data processing circles of the University of Pisa, leads research programs on advanced models; the University of Genoa is directing 3 projects involving artificial vision and robot manipulation.

Over 5 billion lire are parcelled out to the universities of Milan, Turin, Catania, Pisa (in addition to Genoa) and a small portion goes to the National Research Council. However, save a few exceptions, these involve "B" type programs: this is a special category created to satisfy the desire of increased participation lobbied for by each of the nations' ministers. These large European industries, the famous "Twelve Apostles" do not agree. In Italy, this involves Olivetti and STET, which have in the past managed the ESPRIT program and are presently members of the round table of high level consultants.

"B" programs, in reality, go toward justifying almost half of our contributions and a good portion of the dozen billion lire earmarked for the smaller companies. Up to that point may we speak of a varied landscape, the trademark of liveliness of Italian industry and research? Could we have received more?

More in quantity and in quality could have been received if the projects had remained single major units, and not broken up into thousands of minor parts. We could have received more funds had the choice of Italian representatives in Brussels involved truly knowledgeable experts in community negotiations. (One of the representatives was Francesco Pittore, a colleague of the former social democratic Minister for Research Pierluigi Romita, and the other is a university professor, Gesualdo Lemoli.) And what about the fact that at meetings in Brussels, the only Italian present many times was Antonio Gippo, an official of the Ministry for Industry, who in reality was only an ESPRIT consultant. Furthermore, when the adjudicating commissions were in session, why did the Italian members number only 3 out of 5? Because the other two simply did not show up. In the overall picture of Italian participation in ESPRIT, there is also all of the above to be considered.

9209
CSO: 3698/561

BRIEFS

INCREASE IN TECHNOLOGY EXCHANGE--Tokyo--Several European and Japanese banks have agreed to meet in Tokyo this fall for discussions designed to promote technological exchanges and to calm trade disputes, revealed a bank source in Tokyo on 19 April. The major topics for discussion will deal with an increase in investment and in exchange of state-of-the-art technology, such as robotics and electronics, between Japan and the EEC, declared an officer of the Japanese Long Term Credit Bank (LTCB), the lead bank of a group of Japanese banks which has proposed such a meeting to the European Investment Bank (EIB). The proposal was accepted by the presidents of the 11 banks belonging to the EIB organization at a recent meeting of the organization. According to the LTCB officer, the bank will propose the creation of a combined society of venture capital in Europe, of information centers on state-of-the-art technologies in Europe and Japan and of a system for financing high technology projects. Besides the EIB, the European banking organization consists of 10 banks from the EEC, including the French Credit National and the National Investment Bank of Holland. The Japanese group includes, besides the LTCB, the Industrial Bank of Japan, the Nippon Credit Bank and the Bank of Tokyo. Observers from the European Commission, from the Ministry of International Trade and Industry (MITI), from the Japanese External Trade Relations Organization (JETRO) and private businesses will be present at the conference. [Text] [Paris AFP SCIENCES in French 19 Apr 84 p 5] 12666

CSO: 3698/576

END